

<p align="center"><b>15th International Roundtable on Business Survey Frames</b></p> <p align="center"><b>Washington, D.C. – October 22 – 26, 2001</b></p>
<p align="right"><b>Session No 4</b> <b>Paper No 1</b> <b>André Monty, Statistics Canada, Canada</b></p>
<p align="center"><b><i>Business Register Quality Practices</i></b></p>

## ***Background***

The Business Register of Statistics Canada has been developed to support economic surveys and the use of administrative data for statistical programs. The Business Register currently supports 72 Statistics Canada surveys. The Business Register is also used by provincial statistical agencies to conduct statistical projects. The paper describes the various methods and mechanisms put in place to monitor the quality of the Business Register. These methods are designed to assess the out-going quality of data stored on the Business Register as well as the efficiency of the numerous Business Register processes used to maintain the information up-to-date.

## ***Out-Going Quality***

There are four methods currently used to monitor the out-going quality of the Business Register. These methods attempt to measure the specific aspects of the Business Register associated with the use of the Business Register as a sampling frame and as a mailing list for data collection purposes.

## **Quality Assurance Survey**

The purpose of the Quality Assurance Survey is to confirm the accuracy of the latest information recorded on the Business Register with an official of the business or organization. A sample of 20,000 businesses (1% of the total population) is selected representing each major industrial sector of the economy (first level of the industrial classification system) and Canadian provinces. The confirmation process is done through a telephone interview. The information collected is used to calculate:

- Population over-coverage: % of inactive businesses recorded on the Business Register as active businesses
- Erroneous industrial code: % of erroneous industrial code for each level of the industry classification system
- Estimate of the population: Estimation of the population by major industrial sectors after the removal of inactive businesses and businesses classified into other major industrial sectors and the addition of businesses erroneously classified in other major industrial sectors.

Over the last fifteen years, there were three Quality Assurance Surveys.

The results of the Quality Assurance surveys were used within Statistics Canada to establish a program of targeted frame improvements based on quantitative measurements rather than anecdotal comments. The results were also used by other government organizations. For example the results of the Quality Assurance Survey were instrumental in negotiating an agreement with the taxation authorities whereby Statistics Canada would industrially classify all taxation records on the behalf of the taxation authorities.

The Quality Assurance Survey is a tool used very selectively. The undertaking of the survey is costly and adds to the already heavy load of response burden. The timing to proceed with the undertaking of a Quality Assurance Survey is important. The conduct of a Quality Assurance Survey is normally done after the completion of major frame improvement initiatives in order to assess the impact of these initiatives on the out-going quality of the Business Register. There have been many initiatives over the last few years to improve the data quality of the Business Register. There is a proposal to execute another iteration of the Quality Assurance Survey now that these initiatives have been completed.

## Frame Analysis

The Business Register is a very dynamic data file. There are approximately 250,000 new enterprises a year and 150,000 existing enterprises that change from an active status to an inactive one. Large and complex enterprises are also constantly changing: acquiring new operations or rationalizing existing ones. Therefore the survey frame from one survey iteration to another could change significantly. These survey frame changes are mainly the result of legitimate changes in the business population but could also include erroneous processing of information used to maintain the Business Register up-to-date.

To assist the survey manager in the analysis of frame changes, a process called Preliminary Frame Analysis has been developed. Every two months a file containing the new version of the survey frame is compared with the last version of the survey frame. The comparison identifies additions to the survey frame (typically new enterprises) as well as existing enterprises now in the survey frame because of changing classification. Deletions from the survey frame are mainly composed of enterprises now inactive as well as enterprises moving out of the survey because of changing classification are also identified. The comparison also provides information regarding changes to sample stratification variables (Industry, geography and size).

By reviewing the results of the comparison the survey manager has the opportunity to identify frame anomalies. The nature of the anomaly can range from one error to be corrected for one record to a systematic error affecting a segment of the population. Provisions have been made to react quickly to the detection of anomalies.

Even though the participation of survey managers in this program is optional, the frame analysis tool is widely used. The frame analysis tool has been designed to provide operational flexibility. For example the frame analyst has the choice to determine the level of detail required for the analysis.

This approach uses the specialized expertise of the survey manager. The detailed knowledge of an industrial sector is an important factor to identify specific errors that may escape the boundaries of knowledge of individuals or the general logic of Business Register processes that cover all industrial sectors. The detection of frame errors by survey managers and subsequent correction of these errors by frame specialists create a working environment that enhances the efficiency of both the survey and frame processes and the understanding of survey managers and frame specialists. This approach also permits the detection of frame errors way before the start of the survey. This allows more time to correct the errors and ensure a better quality survey frame.

## Newspaper Clippings

As stated previously the undertaking of a Quality Assurance Survey is costly and adds to the response burden imposed on businesses. To fill the gap during the period of time between two Quality Assurance Surveys measures regarding the out-going quality of the Business Register are developed using information available in the business section of newspapers. Specialized business newspapers report information about openings or closures of business locations, buy and sell of business units, corporate takeovers and appointments of senior officers. These newspaper articles often contain information about line of products or services of businesses or a description of what the company does. There is a process that selects articles of interest and posts them on an electronic bulletin board. As part of this process Business Register personnel confirm the existence of the business on the Business Register and that it is correctly classified. The results of the confirmation process are tabulated. The tabulations provide information regarding population under-coverage and potential industrial coding errors. These tabulations are disseminated on an annual basis to survey programs.

Typically businesses for which there are newspaper articles are publicly traded corporations, professional firms and organizations involved in current events. These businesses may not be representative of the entire business population. However, they are the ones that may have the most impact on the statistical system. One advantage of this approach is that the cost of developing the quality estimates is very marginal. These frame quality estimates may be partial but they provide some useful information at a very low cost.

## Survey Feedback

It is mandatory for all surveys using the Business Register to provide to the Business Register frame changes collected through the survey process. The Business Register receives 220,000 notifications of frame changes a year. These frame changes when transmitted to the Business Register are categorized by type of change such as unable to locate, change of name, change of industrial code and inactivation of business. This information is tabulated for each survey.

These tabulations provide an insight to the out-going quality of the survey frame. For a specific survey there is a measure of over-coverage resulting from the survey frame having inactive businesses and erroneously classified businesses. There is also a measure of invalid contact information such as businesses with an invalid address and/or telephone number. This information is available by survey iteration. Therefore quality information related to an individual survey frame for the current iteration could be compared with previous iterations.

The information compiled from survey feedback is used in the development of sampling algorithms to correct for inactive businesses undetected and present in the survey frame. The information is also used to assess the impact of frame improvement initiatives for each survey served by the Business Register.

## ***Business Register Processes***

### Quality Control Review of Industrial Coding

An industrial code is assigned to 250,000 new enterprises each year. The North American Industrial Classification System (NAICS) has 928 different codes. The assignment of industrial code is a two step process. The first step is an attempt to assign an industrial code through an automated procedure. The second step is to manually assign an industrial code to the enterprise for which the automated procedure has failed.

Survey managers now have the opportunity to review the coding assigned to new enterprises. A file containing the industrial activity description and the related industrial code of all new enterprises in scope for an individual survey program is produced on a monthly basis. The survey manager could browse that file to detect coding anomalies. The survey manager has the option to review all records, a sample of records, or a pre-selected segment of the population (above a certain size or other criteria). The survey manager also has the option to choose the periodicity of the review.

The review of the industrial coding uses the expertise of industry specialists to detect erroneous coding patterns of both the automated and the manual coding assignment. The early detection of these problems allows for timely correction prior to the production of the survey frame. This process is intended to be used in the context of annual and quarterly surveys.

In addition to the correction procedures, the review process produces statistical tables describing the number of records reviewed, as well as, the acceptance and rejection rates.

Currently this process is in place for a small number of selected surveys. It is the intention to deploy gradually this process to all surveys using the Business Register.

## Workbench Management Reports

As stated previously, it is mandatory for all surveys using the Business Register to provide to the Business Register frame changes collected through the survey process. These frame changes have to be incorporated in the Business Register before the next iteration of the survey. The Business Register receives approximately 220,000 notifications of change a year. Some of these notifications of change are processed into the Business Register overnight. The others require manual intervention. Among the notifications of change that require manual work, there is always a possibility that a number of these notifications of change will not be processed in time for the next survey iteration. To ensure efficient processing, these notifications of change are ranked in a priority sequence and dispatched to the next available frame specialist. The dispatching system produces management reports describing

- the number of notifications received,
- the number of notifications processed,
- the number of notifications suspended awaiting additional information and finally
- the number of notifications waiting to be dispatched

This set of information is available for each of the surveys supported by the Business Register

This information is used to assess the efficiency of Business Register processes engaged in the manual processing of survey feedback. The information is also used at the beginning of a new iteration of the survey to assess the possible impact of unprocessed work. To support the assessment, the unprocessed work is tabulated by types of notifications. All survey managers use these reports (some more intensively than others).

## Extremely Large and Complex Enterprises

In Canada there are 600 enterprises that are very significant for the statistical system and are also complex in terms of their corporate and operational structures and diversity economic activity. These enterprises receive very particular attention to ensure they are accurate and up-to-date. From an operational point of view it requires:

- timely processing of all survey feedback
- continuous review of published information
- official annual interview with the business
- timely updating of Business Register data based on interview results
- pertinent reports to survey managers

To monitor the efficiency of the program for the extremely large and complex enterprises, a report card has been developed. The report card assess the number of update cases completed, the timeliness of the update and the quality of the data. The report card compares achievements to expected standards. The expected standards have been established in consultation with the employees. The report card is disseminated to all users of the Business Register, as well as, to senior management.

Since the introduction of the report card, there has been a continual and significant improvement in terms of coverage, timeliness and quality of results.

## Joint Review Process

In addition to the extremely large and complex businesses, there are 12,000 other enterprises that are also statistically important and need to be given special attention. These enterprises also represent an element of complexity because of diverse economic activities i.e. they cross out industries. For these enterprises there is a review of the changes to be made on the Business Register by survey managers affected by the proposed changes. The review provides an opportunity for frame specialists to explain the changes and for survey managers to assess the impacts of the changes on their respective surveys. The review is a weekly process and when agreement is reached the updates are applied on the Business Register. In case of disagreement there is one more attempt to resolve the case otherwise the case is resolved without further appeal by the Director of the Business Register Division.

The process maintains statistics regarding the

- number of cases with immediate agreement (first tabling)
- number of cases with agreement on the second attempt (second tabling)
- number of cases going for final decision (third tabling)
- number and percentage of business events that were rejected at each tabling

This process was implemented 15 years ago and has been a successful forum to clarify or modify Business Register concepts and procedures.

## ***Quality of Supplied Data***

### Interceptor

The majority of surveys use either the services of Statistics Canada Regional Offices or of the Central Survey Operation Office located at the Head Office for data collection. These data collection offices are also responsible to provide survey feedback to the Business Register. A large proportion of the survey feedback transmitted to the Business Register is processed in an automated fashion without further verification. Over the years, survey managers have expressed concern over the quality of the information transmitted from the collection centers.

There is now a process that intercepts transmitted survey feedback and presents the information to survey managers and Business Register specialists prior to being used to update the Business Register. Survey managers have the opportunity to review changes regarding collection arrangements and changes to the industrial classification. The Business Register specialists review all frame changes excluding changes to collection arrangements. The Business Register specialists also categorize the survey feedback by the nature of the work (simple task Vs more demanding task). Questionable survey feedback is returned to the collection centers for corrections or further explanations. The depth of review by survey managers varies from one survey to another. Survey managers have five working days to review a transmission file. After that period of time the transmission file is processed. The review by Business Register specialists takes one working day.

In last year 220,000 pieces of survey feedback were transmitted to the Business Register. Approximately 10% of the total number of pieces of survey feedback were returned to collection centers for corrections. 5,000 or 33% of frame changes requiring manual work were directed to a faster and less costly processing stream, which guarantees processing within the next 2 working days.

This process was implemented a year ago and it has been used intensively by most of the Business Register users. The process when first implemented identified many quality problems related to collection centers understanding of Business Register concepts and inconsistent procedures being used by different collection centers. This process has also identified the need for additional training of interviewers in very targeted areas. Most of these problems have since been resolved.

## ***Conclusion***

The quality assurance program for the Business Register is far from being exhaustive and well integrated. The quality assurance program is composed of several initiatives designed over time to resolve specific issues. Some of the most recent initiatives also reflect the evolution that has taken place in Statistics Canada. There has been a fundamental change in recent years regarding the responsibility for the quality of the Business Register from being the sole responsibility of frame specialists to being a shared responsibility with survey managers and data collection centers. The Quality assurance program will continue to evolve in order to satisfy the diverse needs of the various users of the Business Register.